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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Yuan-Chi Chang

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

PHAM, HUNG Q

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/724,897	Applicant(s) CHANG ET AL.	
	Examiner HUNG Q. PHAM	Art Unit 2159	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,10,11,13,14,16-19,23,24,26,28-31,35,36 and 38-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,10,11,13,14,16-19,23,24,26,28-31,35,36 and 38-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/03/2009 has been entered.

Response to Arguments**Claim Rejections - 35 USC § 112**

- The rejection of claim 10 under 35 U.S.C. § 112, 2nd paragraph, has been withdrawn in view of the amendment.
- Claim 40 was rejected under 35 U.S.C. § 112, 2nd paragraph. The clause *said polyline segment* as recited in claim 40 is indefinite. The applicant has not amended claim 40 to clarify the claimed languages. The rejection of claim 40 is continued as following.

Claim Rejections - 35 USC § 102

- Applicant's arguments with respect to the rejection of claims 1, 14 and 26 under 35 U.S.C. § 102(b) have been fully considered but they are not persuasive.

As argued by applicant (Remarks, Page 12):

Applicants again submit, however, that there are elements of the claimed invention which are neither taught nor suggested by Bergman or any of the other references currently of record.

More specifically, none of these references teach or suggest storing either the generation of an index for the additional information generated for the semantic objects or the of the semantic objects along with their associated summary of attributes, confidence level, and indexing information. The Examiner vaguely

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makes an attempt to justify these limitations by noting that Bergman suggests pre-extracting semantic objects and stores them with their boundary information and associated attributes such as size and centroid (see Office Action, page 3, middle of full paragraph in middle of page).

However, even giving the benefit of doubt to the Examiner's reliance, this description relied upon by the Examiner fails to demonstrate an index as being generated for these attributes, as required by the plain meaning of the claim language of the independent claims. This indexing feature of the claimed invention permits a user to quickly view the semantic objects in overview, as well as conduct query searches over the collection of semantic objects themselves or, selectively, to retrieve the underlying raw data associated with any of the semantic objects.

Hence, turning to the clear language of the claims, in Bergman there is no teaching or suggestion of: "... generating indexing information for the summary of attributes, the confidence level, and the compact representation of said semantic object; and storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and indexing information in a semantic object database associated with a database storing said raw data", as required by independent claim 1. The remaining independent claims have similar wording.

The examiner respectfully disagrees.

Claims 1, 14 and 26 were amended by indicating the "*summary of attributes*", "*confidence level*" and "*compact representation*" were all indexed. As described in the Specification of the current application (Specification, Page 13, Lines 10-13 and Page 19, Lines 18-20), the R-tree is used to index only the *summary of attributes* and *the compact representation*. The *confidence level* of the semantic object was not indexed. The claimed limitation *generating indexing information for... the confidence level... of said semantic object* was not described in the Specification. For the purpose of examination, the step of *generating indexing information* is examined in light of the Specification of the current application, i.e., *generating indexing information for the summary of attributes and the compact representation*.

The PetroSPIRE of Bergman is an application for the petroleum E&P (Exploration and Production) constructed and designed for searching archives of imagery and other associated

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data collected from oil well bores (Bergman, Page 450, Lines 37-38). Raw data in lattice format, e.g., FMI images, is stored in raw data storage (Bergman, Page 457, Lines 11-12). Features such as texture or local color histogram are extracted from the raw data (Bergman, Page 454, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree. The computed texture features includes various gray-level statistics and entropy (Bergman, Page 457, Lines 43-51). Features can be further abstracted by segmenting the image and assigning a semantic label, e.g., "shale" or "siltstone", to each contiguous region. Each semantic object so obtained is stored with boundary information and associated attributes such as size and centroid (Bergman, Page 454, Lines 13-17). The data repository for SPIRE includes a relational database that is used to store metadata, raw image data, derived features and semantic objects (Bergman, Page 453, Lines 13-15). As shown in Bergman's FIG. 4a is the revised definition of semantic object "shale", wherein the semantic object "shale" is redefined with Gamma Ray is greater than 45 (Bergman, Page 452, Lines 12-16).

The Bergman's teaching as discussed indicates that *from raw data*, e.g., FMI images, *a semantic object* is obtained or *received* by abstracting the extracted texture features in the form of vectors and segmenting the image, the semantic object is *classified to comprise said semantic object*, e.g., assigning a semantic label such as "shale" or "siltstone". The obtained semantic object as taught by Bergman has the assigned semantic label, e.g., "shale" or "siltstone", as *one or more attributes*.

The computed various gray-level statistics and entropy of texture features of the semantic object that assigned semantic label such as "shale" or "siltstone" is considered as being equivalent to the step of *generating a summary of attributes of said semantic object by calculating one or more statistics of one or more of said one or more attributes of said received semantic object*.

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The constraint of Grammar Ray level as defined in Bergman's FIG. 4a such as Gamma Ray is greater than 45 of the semantic object "shale" is considered as being equivalent to *a confidence level of said received semantic object that is generated*, wherein the constraint of Grammar Ray level *quantifies a degree of certainty that said received semantic object has been correctly classified and/or labeled*, e.g., "shale" is labeled to the extracted texture features based on Gamma Ray is greater than 45.

As discussed above regarding Bergman's teaching, features such as texture or local color histogram are extracted from the raw data (Bergman, Page 454, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree (Bergman, Page 457, Lines 43-51). The disclosure of the extracted texture features in the form of vectors from raw data of the semantic object with an assigned semantic label indicates the step of *generating a compact representation of raw data of said received semantic object*.

As taught by Bergman, raw data in lattice format, e.g., FMI images, is stored in raw data storage (Bergman, Page 457, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree. The computed texture features includes various gray-level statistics and entropy (Bergman, Page 457, Lines 43-51). The Bergman' disclosure of indexing the computed texture features includes various gray-level statistics and entropy in the R-tree indicates the step of *generating indexing information for one or more of the summary of attributes and the compact representation*. In view of the Specification, the *confidence level* of the semantic object was not indexed. However, as taught by Bergman, The data repository for SPIRE includes a relational database that is used to store semantic objects (Bergman, Page 453, Lines 13-15). By storing the semantic object including the constraint of Gamma Ray as *confidence level* in relational tables, these features are indexed either by the row IDs or object ID in the

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corresponding table, which are *indexing information* for the *confidence level*. The *indexing information* for the *confidence level* is inherited feature of Bergman's teaching.

Bergman teaches that the data repository for SPIRE includes a relational database that is used to store metadata, raw image data, derived features and semantic objects (Bergman, Page 453, Lines 13-15). The Bergman's relational database is considered as being equivalent to the claimed *semantic object database*. The Bergman's semantic object storing in the relational database includes the constraint of Grammar Ray level as *confidence level*. The Bergman's derived features storing in the relational database include the computed various gray-level statistics and entropy of texture features of "shale" or "siltstone" semantic object as *summary of attributes*. The Bergman's extracted texture features in the form of vectors from raw data of the semantic object with an assigned semantic label is *the compact representation*. The Bergman's raw data storage storing raw data is considered as the claimed *a database storing said raw data* that is associated with the relational database or *semantic object database*. The storing of R-tree as *indexing information* in the relational database or *semantic object database* is implied in Bergman's teaching.

In short, Bergman teaches the step of *storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and the indexing information in a semantic object database associated with a database storing said raw data*.

The Bergman teaching indicates *the semantic object* such as semantic objects labeled as "shale" or "siltstone", *along with its associated summary of attributes*, e.g., the computed various gray-level statistics and entropy of texture features of the semantic object such as "shale" or "siltstone"

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- Applicant's arguments with respect to the rejection under 35 U.S.C. § 103(a) have been fully considered but they are not persuasive. Claims 10, 11, 23, 24, 35, 26 and 38-40 are unpatentable over Bergman in view of Li and Yu for at least the reasons as discussed above with respect to claims 1, 14 and 26.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 10, 11, 13 and 38-40 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

A patentable process must (1) be tied to a particular apparatus or machine or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. See *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Fed. Cir. 2008). The method of claims 1, 10, 11, 13 and 38-40 is non-statutory in view of *In re Bilski*, e.g., the recited method is not tied to a particular machine or apparatus, or it transforms a particular article into a different state or thing.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claims 1, 14 and 26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claimed limitation *generating indexing information for... the confidence level... of said semantic object* was not described in the Specification. As described in the Specification of the current application (Specification, Page 13, Lines 10-13 and Page 19, Lines 18-20), the R-tree is used to only index the *summary of attributes* and *the compact representation*. The *confidence level* of the semantic object was not indexed. For the purpose of examination, the step of *generating indexing information* is examined in light of the Specification of the current application, i.e., *generating indexing information for one or more of the summary of attributes and the compact representation*.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 40 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 40, the clause *said polyline segment* references to other items in the claim. It is unclear what item is being referenced.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-6, 13, 14, 16-19, 26, 28 and 29-31 are rejected under 35 U.S.C. 102(b) as anticipated by Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications].

Regarding claims 1, 13, 14 and 26, Bergman teaches a method for storing information for one or more semantic objects derived from raw data (Bergman, Abstract), the method comprising:

receiving a semantic object extracted from said raw data and classified to comprise said semantic object, said received semantic object having one or more attributes (The PetroSPIRE of Bergman is an application for the petroleum E&P (Exploration and Production) constructed and designed for searching archives of imagery and other associated data collected from oil well bores (Bergman, Page 450, Lines 37-38). Raw data in lattice format, e.g., FMI images, is stored in raw data storage (Bergman, Page 457, Lines 11-12). Features such as texture or local color histogram are extracted from the raw data (Bergman, Page 454, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree. The computed texture features includes various gray-level statistics and entropy (Bergman, Page 457, Lines 43-51). Features can be further abstracted by segmenting the image and assigning a semantic

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label, e.g., "shale" or "siltstone", to each contiguous region. Each semantic object so obtained is stored with boundary information and associated attributes such as size and centroid. Metadata of the raw data such as acquisition date, coverage region... forms the most compact representation is also stored at the tip of information pyramid (Bergman, Page 454, Lines 13-17), which is a two-layer structure designed to facilitate query specification and processing (Bergman, Page 454, Lines 5-7). The data repository for SPIRE includes a relational database that is used to store metadata, raw image data, derived features and semantic objects (Bergman, Page 453, Lines 13-15). As shown in Bergman's FIG. 4a is the revised definition of semantic object "shale", wherein the semantic object "shale" is redefined with Gamma Ray is greater than 45 (Bergman, Page 452, Lines 12-16). The Bergman's teaching as discussed indicates that *from raw data*, e.g., FMI images, *a semantic object* is obtained or *received* by abstracting the extracted texture features in the form of vectors and segmenting the image, the semantic object is *classified to comprise said semantic object*, e.g., assigning a semantic label such as "shale" or "siltstone". The obtained semantic object as taught by Bergman has the assigned semantic label, e.g., "shale" or "siltstone", as *one or more attributes*);

generating:

a summary of attributes of said semantic object by calculating one or more statistics of one or more of said one or more attributes of said received semantic object (The computed various gray-level statistics and entropy of texture features of a semantic object such as "shale" or "siltstone" is considered as being equivalent to the step of *generating a summary of attributes of said semantic object by calculating one or more statistics of one or more of said one or more attributes of said received semantic object*);

a confidence level of said received semantic object that quantifies a degree of certainty that said received semantic object has been correctly classified and/or labeled (The constraint of Gamma Ray level as defined in Bergman's FIG. 4a such as Gamma Ray is greater than 45 of the semantic object "shale" is considered as being equivalent to *a confidence level of said received semantic object* that is

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generated, wherein the constraint of Grammar Ray level *quantifies a degree of certainty that said received semantic object has been correctly classified and/or labeled*, e.g., “shale” is labeled to the extracted texture features based on Gamma Ray is greater than 45); and

a compact representation of raw data of said received semantic object (As discussed above regarding Bergman’s teaching, features such as texture or local color histogram are extracted from the raw data (Bergman, Page 454, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree (Bergman, Page 457, Lines 43-51). The disclosure of the extracted texture features in the form of vectors from raw data of the semantic object with an assigned semantic label indicates the step of *generating a compact representation of raw data of said received semantic object*);

generating indexing information for one or more of the summary of attributes, the confidence level, and the compact representation of said semantic object (As taught by Bergman, raw data in lattice format, e.g., FMI images, is stored in raw data storage (Bergman, Page 457, Lines 11-12). The extracted texture features in the form of vectors are appropriately indexed in an R-Tree. The computed texture features includes various gray-level statistics and entropy (Bergman, Page 457, Lines 43-51). The Bergman’ disclosure of indexing the computed texture features includes various gray-level statistics and entropy in the R-tree indicates the step of *generating indexing information for one or more of the summary of attributes and the compact representation*. In view of the Specification, the *confidence level* of the semantic object was not indexed. However, as taught by Bergman, The data repository for SPIRE includes a relational database that is used to store semantic objects (Bergman, Page 453, Lines 13-15). By storing the semantic object including the constraint of Gamma Ray as *confidence level* in relational tables, these features are indexed either by the row IDs or object ID in the corresponding table, which are *indexing information* for the

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confidence level. The *indexing information* for the *confidence level* is inherited feature of Bergman's teaching); and

storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and the indexing information in a semantic object database associated with a database storing said raw data (Bergman teaches that the data repository for SPIRE includes a relational database that is used to store metadata, raw image data, derived features and semantic objects (Bergman, Page 453, Lines 13-15). The Bergman's relational database is considered as being equivalent to the claimed *semantic object database*. The Bergman's semantic object storing in the relational database includes the constraint of Grammar Ray level as *confidence level*. The Bergman's derived features include the computed various gray-level statistics and entropy of texture features of "shale" or "siltstone" semantic object as *summary of attributes* and extracted texture features in the form of vectors from raw data of the semantic object with an assigned semantic label as *the compact representation* is stored in the relational database. The Bergman's raw data storage storing raw data is considered as the claimed *a database storing said raw data* that is associated with the relational database or *semantic object database*. The storing of R-tree as *indexing information* in the relational database or *semantic object database* is implied in Bergman's teaching. In short, Bergman teaches the step of *storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and the indexing information in a semantic object database associated with a database storing said raw data*).

Regarding claims 3, 16, and 28, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the summary of attributes, confidence level, and/or compact representation is generated and stored in said semantic object database for each of a plurality of said semantic objects and said semantic object database can be searched* (Bergman, Page 455-457, 5.2 Query Specification).

Regarding claims 4, 17, and 29, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 26, Bergman further discloses *a query used to search said semantic object database will identify any of a semantic object having attributes that match one or more terms of said query and the identified semantic object can selectively be retrieved, including selectively retrieving at least one of: any information in said semantic object database associated with said identified semantic object; and any of the raw data associated with said identified semantic object* (Bergman, Pages 455-457, 5.2 Query Specification, 5.2.1 DanDE User Interface, 5.3 Query Processing).

Regarding claims 5, 18, and 30, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 28, Bergman further discloses *an optimizing mechanism is used in searching to optimize a process of searching* (Bergman, Page 459 Lines 7-10, indicating a dimensionality reduction algorithm that locally reduces the dimensionality of the search space. Lines 5-6 indicate that the search process can be extremely time-consuming if a linear scan is performed, hence, the dimensionality reduction algorithm is presented as a time-saving optimization to the search process).

Regarding claims 6, 19, and 31, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object represents a model of a phenomena of interest that is measured by a collection of data which exceeds a data size that is accessible with a predetermined efficiency by multiple simultaneous users* (Bergman, Page 449 Lines 27 and 35, indicating that the semantic objects represent phenomena related to petroleum well-bore data, and that the volume of this data is extremely large).

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Claim 38 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] and Li et al. [Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application].

Regarding claim 38, Bergman teaches all of the claimed subject matter as discussed above with respect to claim 1, Bergman further discloses *the semantic object has been previously extracted* (As disclosed by Bergman at Page 457 Lines 27-29, the object definition can be used to pre-extract semantic object) and *comprises a channel* (Page 450, The Application Area).

The missing of Bergman is *geological seismic survey data* for extracting semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, can be used to generate texture features and used the texture features for extracting semantic object.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10, 11, 23, 24, 35, 36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] in view of Yu et al. [A Framework for Mining Sequence Database at Multiple Abstraction Levels].

Regarding claims 10, 23, and 35, Bergman does not explicitly teach *the compact representation comprises a multiple segment polyline*.

Yu teaches *the compact representation comprises a multiple segment polyline* (Yu, Page 268 Col. 1 Lines 1-8, segmenting data, then finding a linear approximation to each segment. These line segments comprise a polyline, since a polyline is simply a line comprised of one or more line segments (see Wikipedia definition of polyline included in this Office Action)).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of summarizing a semantic object taught by Bergman by the method of approximating data by a polyline taught by Yu, because approximating a semantic object by a polyline enables similarity searches, particularly to identify data with similar geological features (Yu, Page 267, Col. 1 Lines 6-11 and Col. 2 Lines 4-6).

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Regarding claims 11, 24, and 36, Yu further discloses *each segment of the multiple segment polyline comprises a best fit line having end point coordinates and a slope* (Yu, Page 270 Col. 1 Lines 22-25, showing the segments have endpoints; Page 270 Col. 1 Lines 41-43, showing the segments have a slope).

Regarding claim 39, Bergman and Yu, in combination, teach all of the claimed subject matter as discussed above with respect to claim 11, Bergman further discloses *an R-tree spatial index structure is used to facilitate a retrieval of a structure that approximates a polyline* (Bergman, Page 457, Lines 43-51).

Regarding claim 40, Bergman and Yu, in combination, teach all of the claimed subject matter as discussed above with respect to claim 11, Bergman further discloses *said polyline segments are searchable using one or more terms of a sub-query of a query* (Bergman, Page 457, Lines 43-51).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAMES K. TRUJILLO can be reached on 571-272-3677. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG Q. PHAM/
Primary Examiner, Art Unit 2159

HUNG Q. PHAM
Primary Examiner
Art Unit 2159

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